

Patent Claims

1. Method of measuring the two-dimensional potential distribution in CMOS semiconductor components and of determining the two-dimensional dopant distribution by use of electron holography, superposing a reference wave and an image wave to determine the phase of an electron wave in a transmission electron microscope which is directly proportional to the potential distribution, with a lateral accuracy in the nm range.
2. Method of claim 1, characterized by the method steps of
- generating a planar electron wave (!);
 - modulation of the planar electron wave (1) by transmission through the semiconductor device structure;
 - enlarging the transmitted now modulated electron wave, or image picture wave (3) using an objective lens (5);
 - superposing the enlarged modulated image wave (3) and a planar reference wave (6) by means of an electron bi prism (4);
 - registering the generated electron hologram (7);
 - extracting the phase of the image wave (3) by a Fourier analysis; and
 - determining the two-dimensional potential distribution from the phase image.
3. Method of claim 1 or 2, characterized by the fact that the potential distribution generated by the dopant distribution is adjusted to the potential distribution measured with electron holography using numerical simulations of the potential corresponding to the dopant distribution.